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DISTURBED SEXUAL CHARACTERISTICS IN MALE MOSQUITOFISH (*GAMBUSIA HOLBROOKI*) FROM A LAKE CONTAMINATED WITH ENDOCRINE DISRUPTERS

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Running title

Altered sexual characteristics in mosquitofish.

Key words

Antiandrogen, courtship behavior, endocrine disruption, estradiol, mosquitofish, sex characters, sperm count, testosterone.

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List of Abbreviations

DDD: 1,1-dichloro-2,2-bis(*p*-chlorophenyl)ethane

DDE: 1,1-dichloro-2,2-bis(*p*-chlorophenyl)ethylene

DDT: 1,1,1-trichloro-2,2-bis(*p*-chlorophenyl)ethane

EDC : Endocrine disrupting compound

RIA: Radioimmunoassay

MS-222: 3-Amminobenzoic acid ethyl ester

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Materials and Methods

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Abstract

Previous laboratory studies have demonstrated that estrogenic and antiandrogenic chemicals can alter several sexual characteristics in male poeciliid fishes. Whether similar disturbances occur under field conditions remains to be confirmed. Lake Apopka (Florida, USA) is contaminated with numerous chemicals, some of which possess endocrine disrupting activity. Male mosquitofish (*Gambusia holbrooki*) were collected monthly from December 2000 through May 2001 from Lake Apopka and two nearby reference lakes, Orange Lake and Lake Woodruff National Wildlife Refuge. Selected sexual characteristics were compared temporally and among lakes during the collection period. Male fish from Lake Apopka had slightly shorter gonopodia and on average 32% and 47% fewer sperm cells per mg testis, when compared to the fish collected from Orange Lake and Lake Woodruff, respectively. The testes weights increased markedly during spring with significantly smaller testes in fish from Lake Apopka than from Orange Lake, but surprisingly, the smallest testes occurred in males obtained from the Lake Woodruff population. The highest liver weights were found in the Lake Apopka population. Whole body concentrations of testosterone and estradiol varied among months; peak testosterone concentration occurred in January and was significantly lower in male fish from Lake Apopka compared to Orange Lake. The intensity of male courtship behavior was highly correlated to body testosterone concentration, but no statistically significant differences in sexual behavior among the lakes were found. It is concluded that sexual characteristics of relevance to male reproductive capacity are altered in the Lake Apopka mosquitofish population. The presence of chemicals with antiandrogenic effects in Lake Apopka as a possible cause of the observed alterations is discussed.